

Environmental
Measurements
Laboratory

FY 2001
Annual Report



A Federal Technical Resource

Service Through Science

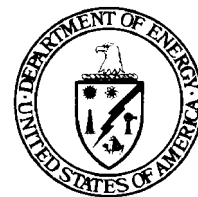


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Director's Message

In FY 2001, EML participated in a highly successful program review conducted by the Office of Environmental Management's (EM) Office of Science and Technology (OST), and the Chicago Operations Office (CH). An on-site review is an important tool for assessing the institutional health of an EM laboratory, and for insuring that the laboratory is aligned with EM's cleanup mission requirements. As a result of the review, EM has expressed that a better understanding was gained of EML's unique role as a government-owned, government-operated (GOGO) laboratory, and what EML can contribute to EM and other DOE program missions. Our presentations clearly demonstrated the importance of EML's role in providing technical assistance to the Department, its contractors, and management. The reviewers identified six primary areas where EML contributes to EM's cleanup mission:

- Providing technical assistance to field sites,*
- Demonstrating the advantages of survey planning,*
- Offering legitimacy to site characterization and closure technologies,*
- Assessing environmental radiation data,*
- Providing a technically sound approach to the long-term stewardship program,*
- Working independently as federal employees to support EM on technical issues.*

I am pleased to present this overview of EML's FY 2001 program accomplishments. We, the staff and management of EML, welcome this opportunity to share our progress in the field of radiation and radioactivity measurements, science and technology for environmental cleanup, and national defense.

As demonstrated by our FY 2001 accomplishments, EML is poised to contribute in the areas of radiation and radioactivity measurements as DOE expands on its national security mission.



Mitchell D. Erickson, Director



EML's Impact

EML – A radiation and radioactivity technology laboratory

“EML is a federal technical resource that addresses environmental radiation and radioactivity issues for environmental quality, science, and national security.”

Cleanup efforts across the DOE complex require a wide range of low-level radiation and radioactivity assessments that are used in contaminant characterization studies, remediation control guidance, final status surveys, and long-term stewardship. In some situations specialized environmental or worker protection compliance monitoring is required. EML, as a federal organization, provides the Office of Environmental Management (EM) with technical and unbiased radiation and radioactivity expertise in:

- Cleanup criteria
- Radiation survey planning
- Design and fabrication of instruments



Real-time spectrometric measurements being demonstrated at the Fernald Environmental Management Project

- Real-time measurements and laboratory analyses
- Sampling of environmental media
- Assessment of radiation dose to humans
- Measurement quality assessment

EML – A federal interface with EM sites

EML helps to meet the needs of EM by serving as an interface between DOE and contractor staff on technical issues that impact on remediation goals and strategies. This includes providing consultation on radiation survey planning, data quality objectives, background levels of radionuclides, radiation dose models, environmental

transport, measurement techniques, and data assessment. EML itself also performs environmental measurements when independent expert assessments are needed, as in the case of demonstration surveys, comparability studies, continuous monitoring for ES&H impact, and retrospective dosimetry studies.



Sites across the DOE complex at which EML has provided field technical support

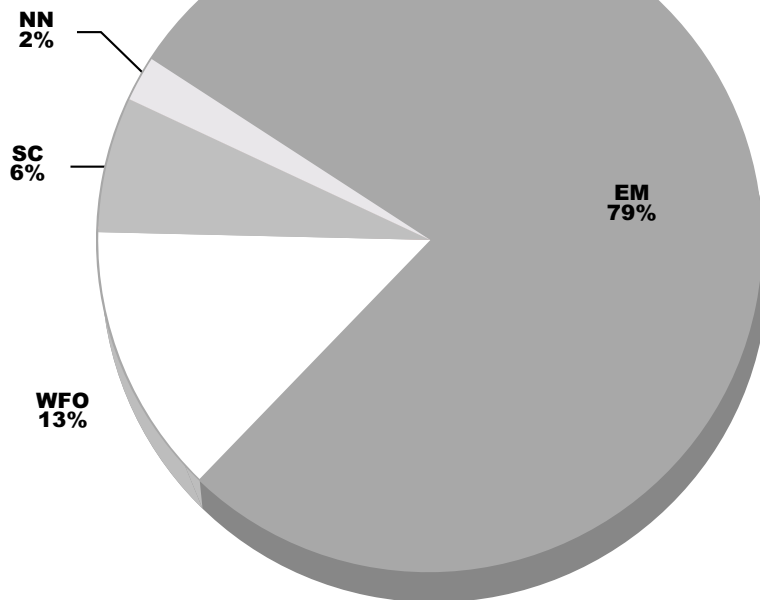
Customers

EML – A federal technical resource

In addition to EM, its main customer, EML serves a broad range of federal customers, primarily in DOE that require applied research and operational capability in environmental radiation and radioactivity measurements, quality assessment, and technical data management. EML's FY 2001 federal customers included:

- Office of Environmental Management (EM)
- Office of Science (SC)
- Office of Defense Nuclear Nonproliferation (NN)
- DoD Air Force (AF)
- DoD Defense Threat Reduction Agency (DTRA)
- DoD Army Corps of Engineers (ACE)
- Defense Programs (DP)
- Environmental Protection Agency (EPA)
- Nuclear Regulatory Commission (NRC)

Funding



EML's funding in FY 2001 by sponsoring agency

Environmental Radiation & Radioactivity Measurements

Quality data—
fundamental to
saving time, money,
and protecting health

QUALITY ASSURANCE ACTIVITIES

EML's quality assurance (QA) activities support EM's site closure and cleanup efforts by assessing the quality of environmental radiation and radiological measurements. Accurate and precise field and analytical data is essential for important characterization, remediation, and long-term monitoring decisions. Defensible data allows program managers to make better and more cost effective decisions, which translates into cost savings and a healthier environment for cleanup workers and the public. For example, the technologies that are most appropriate for a given cleanup problem are determined in large part by the extent of the radiological contamination and how accurately it is measured.

QA is a prime example of EML's services to EM and other government, national and international organizations. EML is known around the world for its various testing and intercomparison programs.

Quality Assessment Program (QAP)

EM

The goal of QAP is to provide a way for DOE contractor and subcontractor laboratories to substantiate their ability to analyze for low-level radionuclides at contaminated sites. Laboratories routinely analyze soil, water, vegetation, and air filter samples from DOE sites—measuring the emission of gamma rays and alpha and beta radiation to determine what radioactive elements are present and in what quantities.

Twenty-six laboratories participated in the first QAP in 1976. More than 170 laboratories participated in the most recent QAP. A summary evaluation is available to the participants, DOE managers, and stakeholders via the EML Web Site (www.eml.doe.gov) 48 hours after the reporting deadline. In FY 2001, EML successfully



Preparation of air filters for QAP

completed the 53rd and 54th QAP and published the results in EML-611 and 613. The program was highlighted at the National Analytical Management Program (NAMP) meeting in Salt Lake City, September 11-13, 2001. (Raymond.Bath@eml.doe.gov)

Gamma Spectrometry Data Evaluation Program

EM

The EML Gamma Spectrometry Data Evaluation Program is a QA program that allows DOE laboratories and contractors to evaluate and improve their gamma spectrometry analysis techniques. The program utilizes synthetic spectra that emulate the output of a germanium detector under various conditions.

Very complex spectra or spectra designed to test a specific feature of the gamma analysis procedure can be created. Since synthetic spectra are used, the program supports DOE efforts toward the minimization of radioactive waste creation, storage, and disposal. The program is also used as a training tool to teach

laboratory personnel proper nuclide identification and quantification techniques.

An analysis of the results of the third distribution of the program was published in an EML Report (EML-612, January 2001, available at www.eml.doe.gov), and was presented at the 2001 Waste Testing and Quality Assurance Symposium in Arlington, VA, August 2001. Fifty laboratories have registered as participants for the next evaluation to begin in the summer of 2002. (*Karin.Decker@eml.doe.gov*)

Radiological Traceability Program (RTP)

EM

EML continues to serve as a Reference Laboratory for the DOE Radiological Traceability Program (RTP). The National Analytical Management Program (NAMP) established the RTP to support EM's need for high quality data from DOE radioanalytical contractor laboratories. A Reference Laboratory status means that EML is directly traceable to the National Institute of Standards and Technology (NIST) for both the preparation and the characterization of



EML's gamma spectrometry facility

performance evaluation (PE) materials. The process of establishing traceability consists of a periodic exchange of materials with NIST, followed by analyses for selected types of radionuclides, and an evaluation of these results using ANSI N42.22 acceptance criteria as a guide. As of FY 2001, EML's traceability to NIST has been established for water and soil PE materials. (*Anna.Berne@eml.doe.gov*)

Thermoluminescence Dosimetry (TLD) Intercomparison Program

EM, NN

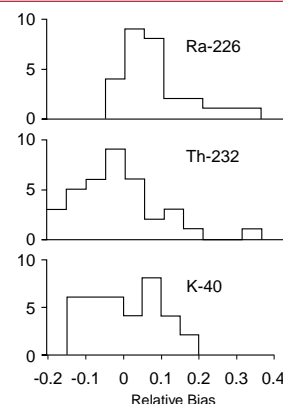
The results of the 12th International Intercomparison of Environmental Dosimeters, conducted by EML in collaboration with Brookhaven National Laboratory (BNL), NIST and the International Atomic Energy Agency (IAEA), were obtained from all of the participants and summarized during FY 2001. EML began these inter-comparisons in 1974 to provide participants with a means to assess their performance, test state-of-the-art techniques, and address issues in environmental dosimetry. The 12th intercomparison included 131 participants from 42 countries. Each set of dosimeters was subjected to five performance tests in the laboratory and the field. The group results in all testing categories were good and comparable to past intercomparisons



Dosimeters positioned for ^{137}Cs exposure at BNL's irradiation facility

with over 80% of the results within 35% of the reference value. The results were presented this year at the Solid State Dosimetry Conference in Athens, Greece. (*Matthew.Monetti@eml.doe.gov*)

In FY 2001, the results of the *in situ* spectrometry intercomparison staged by EML and the Environmental Protection Agency's Office of Radiation and Indoor Air (ORIA) were analyzed. The intercomparison was held at the Walker Field Large-Area Calibration Pads in Grand Junction, CO in FY 2000. The results reinforced the generally good agreement found between soil samples and *in situ* measurements for naturally occurring gamma-emitting radionuclides in surface soil. The results also demonstrated that the Walker Field Calibration Pads cannot be used as a standard for *in situ* measurements of ^{226}Ra without measurements of the ^{222}Rn exhalation. In FY 2002, the results will be submitted for publication in a peer-reviewed journal. EML plans to continue



Analysis of the relative bias (relative to soil sample data) for the background site grouped by radionuclide

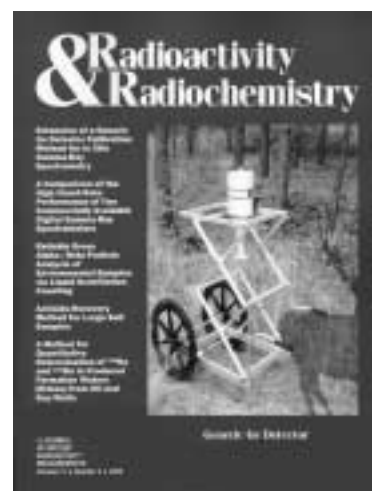
ue holding intercomparisons as part of a continuing effort to establish QA for field measurements. *Peter.Shebelle@eml.doe.gov*

Low-level Radiation
Detection and
Measurements
Instruments

INSTRUMENTS AND METHODS DEVELOPMENT

EML has a long history of developing low-level radiation detection and measurement instruments. While many of these instruments have led to commercial products, many are developed for small niche, customer-specific requests. EML's current efforts in technology development are applied to EM characterization and monitoring for long-term stewardship programs. EML also develops methodology for environmental sampling, low-level radiation field measurements, and analytical determination of radionuclide contents in air, soil, water, and other media.

In order to provide a simplified alternative calibration technique for germanium detectors used for *in situ* gamma-ray spectrometry, EML evaluated the responses of a number of different size detectors and derived generic equations that can be used to calculate the fundamental *in situ* calibration parameters. These equations only require the detector specifications provided by the manufacturer and yield calibration factors that are accurate to within 15%. The technique is an extension of a previous generic calibration study and it extends the applicability to a detector relative efficiency of up to 150%. A paper on the subject was published in *Radioactivity and Radiochemistry* that featured a cover photo by EML. *(Kevin.Miller@eml.doe.gov)*



Cover of *Radioactivity and Radiochemistry* featuring one of EML's field gamma-ray spectrometers

Portable Aerosol Sampling System (PASS)

EM

During FY 2001, EML's portable aerosol sampler system (PASS), used for sampling at Fernald Environmental Management Program (FEMP), underwent major improvements in its pneumatic system with the addition of new, high efficiency vacuum pumps that will provide long-term dependable sampling. The uniqueness of PASS is its ability to provide a "time history" of atmospheric aerosol concentrations. There is no other instrument on the market that is as versatile as PASS for automated sampling of aerosols in urban, rural or remote environmental regions. (*Robert.Leifer@eml.doe.gov*)



PASS deployed at FEMP

Neutron Spectrometry

EM

EML is internationally recognized for its research in neutron spectrometry (measuring the energy distribution of neutron radiation). Neutron spectrometry is essential for understanding the negative effects of neutron radiation on human health and on the reliability of digital electronics. The EML multisphere neutron spectrometer was the primary instrument used in the international Atmospheric Ionizing Radiation (AIR) Project to determine doses from cosmic radiation, especially neutrons, to occupants of high-altitude aircraft. In FY 2001, a new collaboration was formed with the University of Delaware to improve the analysis of the AIR measurements, and invited presentations were given at the November 2000 meeting of the American Nuclear Society and the U.S. Naval Academy.

The instruments and methods developed for this project can be applied to improve radiation dosimetry at accelerators, plutonium



*Cover of the journal Health Physics
featuring the AIR measurements*

handling facilities, and to understand neutron-induced "single-event effects" on microelectronics.

(*Paul.Goldhagen@eml.doe.gov*)

Ideal Poisson Observer

EM

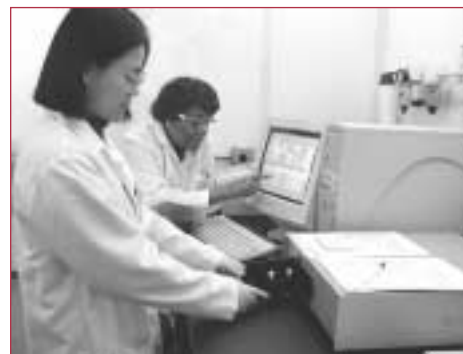
It is often difficult to separate the contribution of background radiation to a measurement from the elevated levels of radioactivity due to radiological contamination during field surveys at cleanup sites. When the source of contamination is abundant, there is no problem locating the contamination. But at lower levels, it may not be as easy to make such a determination. EML is developing the Ideal Poisson Observer, consisting of analytic electronic circuitry connected to a

field survey meter, that would alert the surveyor that a statistically determined threshold was exceeded and to take appropriate action. During FY 2001, a circuit was developed to work with a sodium iodide detector. The next phase in the project is to interface with actual field survey meters and to compare readings with and without the special circuitry. (*William.Van Steveninck@eml.doe.gov*)

Kinetic Phosphorescence Analyzer (KPA)

EM

In FY 2001, EML purchased a kinetic phosphorescence analyzer (Chemchek Instruments, Inc.) that can detect uranium at concentrations in the parts-per-trillion range. The methodology used in the KPA is based on laser excitation of a uranium-bearing solution followed by time resolution of the luminescence signal. The accuracy and precision of the KPA instrument for uranium measurements was evaluated by analyzing QAP and well water samples. The results obtained when compared with the radiochemical method, indicate that the KPA results compare very well with the radiochemical determination. The KPA



KPA instrument

provides a fast, sensitive, and accurate method for detection of uranium in aqueous solutions. (*Ada.Kong@eml.doe.gov*)

Inductively Coupled Plasma/Mass Spectrometry (ICP/MS) Facility

EM

In FY 2001, EML purchased a Thermoelemental PQ Excell ICP/MS. The Excell will be used to characterize the uranium and plutonium isotopic content of natural matrix (soil and vegetation) and synthetic (spiked water and air filters) performance evaluation (PE) samples prepared and distributed by EML's QAP. The ICP/MS will also be used to perform uranium and plutonium analyses of RTP and IAEA PE samples, and uranium analyses of size segregated aerosol samples collected at FEMP. (*John.Kada@eml.doe.gov*)



EML's ICP/MS facility

Aerosol Spectrometer

EM

Researchers at the New York University (NYU) School of Medicine have, under a grant from EM Science Program, developed a miniature aerosol spectrometer. The collection device, coupled with radioactivity measurements and the deconvolution program EVE, bins the sized aerosol activities. This information is then used with the ICRP lung model to estimate the radiation dose that would have resulted from an exposure to the sampled atmosphere.

At present, 20 aerosol spectrometers are deployed at the Fernald Environmental Management Project (FEMP), STUK, Helsinki, Finland, two research locations in New Jersey, and EML. EML is currently operating the aerosol spectrometer on its roof. The purpose of this study is to investigate the possibility of measuring long-lived radionuclides with the spectrometer, specifically the actinides, and analyzing the samples by ICP/MS. (*Isabel.Fisenne@eml.doe.gov*)

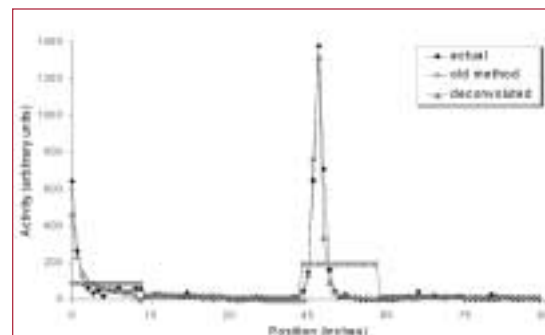
Deconvolution Methods

EM

A Geo-Probe core driven straight into the ground provides a depth profile of contaminants along its length. While it is possible to characterize the depth profile by chemical analysis, workers in the FEMP Real-Time Measurements Program developed a core counter that measures,

in the field, a series of *in situ* gamma-ray spectra along the core. This method achieves reasonable agreement with actual averages of contamination concentrations obtained by an analysis along the core but fails in certain cases. In FY 2001, EML developed procedures for accurately

calibrating such tools and applied data deconvolution techniques to the resulting data. This work achieved impressive results (see figure). Using the same data as collected in previous methods, the deconvolution algorithm can locate hot spots and estimate their contamination level in addition to providing an estimate for average concentrations over sections of the core. Future work will focus on packaging this algorithm in a program that field sites can easily apply to problems they face.
(Paul.Bailey@eml.doe.gov)



The deconvoluted data shows excellent agreement with the actual activity profile in the core as compared with the old method that significantly underestimates the peak activity level

China Initiatives

SC

The World Meteorological Organization's Global Atmosphere Watch (GAW) Program has designated EML as the World Calibration Center for Radioactivity responsible for radionuclide air sampling and calibration worldwide at GAW sites. In this capacity, the Laboratory has initiated the installation of an EML surface air sampling system (SASP) at Mt. Waliguan in Qinghai Province in central China. Mt. Waliguan is already equipped with advanced atmospheric measurement systems, therefore, combined with EML's radionuclide measurements, the site located at 3800 m height will provide unique scientific data for global atmospheric modeling and for studying global transport. In FY 2002, EML plans to add another monitoring site at Guiyang, Guizhou



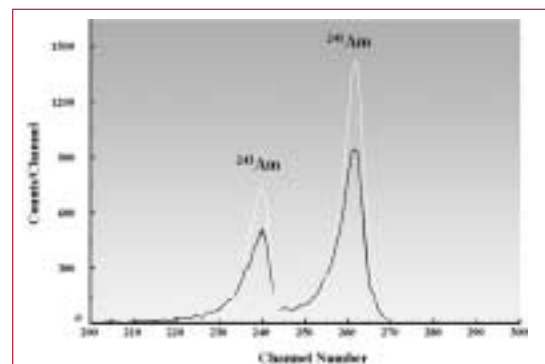
Mt. Waliguan observatory site in the WMO GAW

Province, in southwest China along the eastern slope of the Himalayas. This region is a distinctive environmental unit with great altitude gradients that form a complex landscape with a subtropical climate influenced by monsoons. (Sam.Lee@eml.doe.gov)

EML/NIST Americium Alpha Spectral Analysis Study

EM

There is a growing need at many DOE sites to determine ^{241}Am in low-level environmental samples. However, when using alpha spectrometry to measure the ratio of ^{243}Am (added as a tracer) to ^{241}Am , the overlap of the two peaks has to be resolved accurately for the data to be reliable. A study to evaluate several techniques (algorithms) for the analysis of alpha spectra with overlapping peaks is being conducted in collaboration with NIST. The statistical evaluation of the bias produced by each of the algorithms studied showed that all of the techniques were sensitive to peak shape and displayed



Comparison of spectra from two replicate microprecipitated sources collected under the same counting conditions

some degree of inconsistency. The bias was minimized for samples in which the ²⁴³Am was present in excess of ²⁴¹Am. In FY 2001, these results were presented at national and international conferences, and accepted for publication in a peer-review journal.

An additional phase of the study was conducted in FY 2001 to investigate the

variability of the results obtained from replicate samples studied. An algorithm in use at the Institute for Reference Materials and Measurements (IRMM) in Retieseweg, Belgium, was included in the investigation. A full statistical evaluation of these results will be completed in FY 2002, and will be submitted for publication in a peer-review journal. (*Anna.Berne@eml.doe.gov*)

EML Procedures Manual (HASL-300)

(EM)

The 28th Edition of HASL-300, originally issued in 1957, provides a world-renowned resource for analytical procedures and methods. The Manual is continually updated via EML's Web Site. In FY 2001, two new methods were added: "Strontium-90 in Water, Urine, and Feces," and "Standardization of Yttrium Carrier." EPA approved five procedures (Ra-04-RC,

Sr-01-RC, Sr-02-RC, U-02-RC, and U-04-RC) from HASL-300 under "EPA-Guidelines Establishing Test Procedures for the Analysis of Pollutants, Under the Clean Water Act, National Primary Water Regulations and National Secondary Drinking Water Regulations; Methods Update; 66FR3466-3497, January 16, 2001." (*Nancy.Chieco@eml.doe.gov*)

Standards Development

EM

ANSI-N13.37: American National Standard for Environmental TLDs

EML chairs the American National Standards Institute (ANSI) Standard N13.37 committee developing procedures for the use of TLDs in environmental applications. Environmental TLDs are stationed at the fence-line and in communities near nuclear power plants, research facilities, interim waste storage areas, and remediation sites as part of environmental surveillance programs that assess the radiation dose to the public. The N13.37 committee includes experts from the Nuclear Regulatory Commission, NIST, DOE, academia, and industry. (*Gladys.Klemic@eml.doe.gov*)

ANSI N42.28: In Situ Gamma-Ray Spectrometry

EML is a member of the ANSI N42.rm sub-committee that develops standards, usually performance standards, for radiation detection instrumentation. EML also co-chairs with INEEL a writing group working on ANSI N42.28, "Performance Standard for

the Calibration of Germanium Detectors for *In Situ* Gamma-Ray Measurements." (*Peter.Shebell@eml.doe.gov*)

ANSI N41.5: Radioanalytical Data Verification and Validation

EML is a member of the ANSI N41.5 standard writing committee. The standard is in the final review stages and will be used for the validation of radioanalytical data collected in support of EM projects. (*Pamela.Greenlaw@eml.doe.gov*)

ASTM D19.04: Standard Methods for the Analysis of Radionuclides in Water

EML is a member of the American Standards and Testing Materials (ASTM) D19.04 Committee. The committee is working on a method validation study for the determinations of ⁹⁹Tc, and EML has developed a statistical protocol to evaluate the laboratory data. (*Pamela.Greenlaw@eml.doe.gov*)

FIELD TECHNICAL SUPPORT

As federal technical experts, EML supports EM cleanup and closure activities at DOE sites by demonstrating and deploying advanced radiological measurement and survey methods; by assisting in the collection, interpretation, and modeling of radioactive contaminant data in special low-level (at or near background) situations; and by promoting regulatory and industry acceptance of field radiation measurement technologies.

FEMP – Groundwater Modeling

EML applied its state-of-the-art three-dimensional groundwater model to examine the transport of subsurface uranium contamination at FEMP. Modeling different scenarios of reversible and irreversible chemisorption processes and their associated rates of sorption showed that the irreversible process reduces the ground water uranium plume. Little information from field and laboratory studies exists on

the irreversible sorption of uranium. EML theoretically formulated the sorption rates associated with adsorption, desorption, and chemisorption. Future activities include sequential leaching experiments to characterize the partitioning of uranium from Fernald soil samples, and sorption experiments to determine the sorption rates from the formulations.
(Sam.Lee@eml.doe.gov)

FEMP – Real-time Aerosol Measurements EM

A journal article on EML's work at FEMP on dose calculations and size distribution measurements of atmospheric aerosols was written and submitted to the Health Physics Journal. EML studies at FEMP showed that the aerosol activity median aerodynamic diameter (AMAD) of the Fernald samples collected during the period 1999 to 2000 was at least factor of 6.5 times the normally assumed 1 μm AMAD. Doses to an off-site individual, calculated from samples obtained by FEMP from high volume samplers, are overestimated by a large factor because of underestimating of the FEMP AMAD, and not incorporating the latest lung model into the dose

calculations. To improve FEMP's estimates on dose calculations to the population, aerosol sampling must incorporate size distribution measurements.

The program has been expanded to include the isotopic concentrations of both thorium and uranium airborne aerosol with special attention to ^{230}Th concentrations because of the elevated levels of ^{230}Th found in high volume measurements made at the FEMP. All samples collected will be analyzed by ICP/MS isotopic analysis of thorium and uranium with special attention to the ^{230}Th isotope.
(Robert.Leifer@eml.doe.gov)

FEMP – Real-time Measurement Program

EM

EML continued its support to FEMP in their real-time measurement program. This included serving the team planning the engineering design and application aspects of the Integrated Excavation Control System under an Accelerated Site Technology Deployment (ASTD) program. EML also performed a radon interference study using historical site monitoring data as well as new soil emanation measurements conducted at EML to help in the interpretation of *in situ* gamma-ray spectrometric measurements. At the close of FY 2001, FEMP had essentially completed the soil certification process in survey units outside the former production area, a significant milestone that



Certified area at FEMP

was reached due to the successful application of *in situ* gamma-ray spectrometry.
(Kevin.Miller@eml.doe.gov)

BNL – TLD Monitoring

EM

EML continued providing radiation-monitoring assistance to BNL at the Building 650 Sump Outfall Area through FY 2001. EML has deployed TLDs quarterly at this “area of concern” since FY 1997 to measure ionizing radiation. EML’s measurements provide a radiation baseline, and the ability to track changes if they occurred during the interim monitoring period. EML has over three decades of experience with TLDs, which are inexpensive, small passive devices that are well suited for reliable measurements of environmental radioactivity, such as this application at BNL. During FY 2002, EML will continue to provide



TLD monitoring station at BNL Building 650 Sump Outfall Area

technical expertise while this area undergoes remedial activity.
(Matthew.Monetti@eml.doe.gov)

BNL – Cleanup Criteria

EM

At BNL’s request, EML compiled information from EPA Region II regarding superfund sites cleanup decisions. Pertinent information, such as cleanup goals and rationale for cleanup goals, was reduced into concise documents regarding each site of interest. This information is being used by BNL in

upcoming negotiations with EPA in relation to cleanup levels at DOE sites as compared to those in private industry. This study was performed with the guidance from Joe DiMatteo of CH’s Office of Technical Services.
(Paul.Bailey@eml.doe.gov)

MEMP – Subsurface Soil Characterization

EM

In concert with scientists from Argonne National Laboratory (ANL), Sandia National Laboratory, and Ohio State University, EML assisted in developing characterization strategies for subsurface soils adjacent to the SW and R buildings at the Miamisburg Environmental Management Project (MEMP). The measurement challenge in this case

involved a suite of radionuclides that included the ^{227}Ac series and the presence of the isotope ^{219}Rn . A report on the strategies was issued through the Innovative Treatment and Remediation Demonstration Program of the Subsurface Contaminants Focus Area. (Kevin.Miller@eml.doe.gov)

INEEL – *In Situ* Measurement Quality

EM

EML is assisting the State of Idaho, Idaho National Engineering and Environmental Laboratory (INEEL) Oversight Program with QA issues associated with their *in situ* gamma-ray measurements program. The Oversight Program is a state agency that monitors activities at INEEL on behalf of the citizens of Idaho. The agency has developed a monitoring network to help evaluate the effects of INEEL on public health and the environment. INEEL and the Oversight Program are working together to develop an

in situ gamma-ray measurements program. Using *in situ* gamma-ray spectrometry at INEEL will reduce the costs associated with collecting and analyzing surface soil samples. In FY 2001, the State of Idaho Oversight Program used EML's calibration facility to calibrate their detectors. EML also assisted the Oversight Program with a study demonstrating the comparability of *in situ* gamma-ray measurements with soil sampling at the INEEL. (Peter.Shebell@eml.doe.gov)

AEMP – Subsurface Containment

EM

EML assisted ANL in the development of sampling strategies for estimating subsurface contaminated soil volumes at the RMI Titanium Extrusion Plant at the Ashtabula Environmental Management Project (AEMP) in northeastern Ohio. With uranium as the

primary contaminant of concern, efforts will be made to apply the EM-50 sponsored spectral gamma probe using direct push methods to obtain real-time measurements of soils beneath the extrusion plant. (Kevin.Miller@eml.doe.gov)

ETTP – Real-time Measurement Technologies

EM

To further deploy the real-time measurement technologies that have successfully been applied to nuclide specific measurements at Fernald, EML served on a team with FEMP personnel in a demonstration survey at the East Tennessee Technology Park (ETTP). Federal and state regulatory personnel were shown the effectiveness of both fixed and mobile *in situ* gamma-ray spectrometer

systems for delineation of uranium contamination at a typical field site, the K-901 North Disposal Area. Given the thousands of acres that may require measurements of some type at ETTP, these instrument systems would offer considerable savings in time and money over baseline sampling and laboratory analytical techniques. (Kevin.Miller@eml.doe.gov)

State of Connecticut DEP – Uranium Analysis

EM

The State of Connecticut Department of Environmental Protection (DEP) requested EML's assistance in determining isotopic uranium in drinking water sampled from wells in the Newton Township. Preliminary analyses by the DEP, made at the request of a patient with some bone loss, showed elevated levels of uranium in some wells.

EML was asked to confirm the results for two water samples, and also to provide technical assistance in the areas of sampling protocol, sample preservation, selection of a suitable method of analysis, and in locating background information on the EPA regulations for uranium in drinking water. (Raymond.Bath@eml.doe.gov)

National Security

Radionuclides –
Fundamental to
detecting proliferation
activities, serving as
atmospheric tracers

EML carries out research and development of field and laboratory based advanced analytical instruments and technologies, coupled with current techniques in sample collection and analysis and data reduction, to identify nuclear proliferation threats throughout the world, and to provide advice and consultation on environmental measurements and signatures.

Emergency Response

NNSA

With its unique location in downtown New York City, EML serves as a satellite team for the DOE Radiological Assistance Program (RAP) in Region I, which is operated out of BNL. In FY 2001, EML's Radiation Control Manager served as Region I Team Lead during an exercise conducted in Albuquerque, NM that involved a Radiological Assistance Program Transportation Emergency Response (RAPTER).

EML is a member of the Federal Monitoring and Assessment Center (FRMAC) Laboratory Analysis Working Group. EML's role in the working group is to help to define and support a performance evaluation program for DOE's analytical laboratories. The laboratories would be used to provide radiological data to define the extent and direction of contamination migration in a radiological emergency response.
(Kevin.Miller@eml.doe.gov)

Homeland Security

In the aftermath of the World Trade Center attack of September 11, EML became involved in several Homeland Security initiatives. These initiatives included a request from the EPA Region II that involved researching the DOE complex for available radiation portal monitors to check debris being removed from the site. EML also worked with the EPA air monitoring group from the National Research Exposure Laboratory to help in the siting of dioxin monitors. In addition, EML teamed with the University of California at Davis and installed an eight stage rotating-drum impactor system on the EML roof to provide a time history of the particle size distribution of aerosols and associated concentrations of various pollutants in the air in lower Manhattan. (Kevin.Miller@eml.doe.gov)

Monitoring data from instruments on EML's roof are being displayed on our Homeland Security link from EML's homepage. The instruments include an



Monitoring equipment for homeland security

aerosol particulate collection system; the same type used at our SASP sites, which was reactivated September 17th. Also installed is a pressurized ionization chamber (PIC) that provides total real-time dose assessments. Development has begun on an Intelligent Radiation Detector (IRD), which with continuous software analysis will be able to distinguish between natural and manmade atmospheric radioactivity.
(Colin.Sanderson@eml.doe.gov)

EML's Global Network

NN

EML maintains a global network of aerosol and deposition sampling sites. These programs began over five decades ago and continue to be a useful means to detect the presence and distribution of both anthropogenic and natural radionuclides transported through the atmosphere. Samples are regularly collected and sent to EML. Aerosol samples are analyzed by gamma-ray spectrometry and the results are reviewed and published. The deposition samples are incorporated into EML's sample archive and are available for analysis as the need arises. The network provides a useful tool for detecting and assessing an accidental or



EML's global network site at the South Pole Base

intentional release of radionuclides in the atmosphere. (Fabien.Raccach@eml.doe.gov)

International Environmental Sample Archive (IESA)

NN

In FY 2001, EML completed the development of the IESA, which is an Internet accessible database (<http://iesa.eml.doe.gov/>) containing information on environmental samples (air, water, soil, sediment, vegetation, etc.) that were collected throughout the world. Many of these samples were collected during the period of atmospheric nuclear weapons testing and have unique isotopic compositions. Some samples were collected in the vicinity of former U.S. nuclear weapons production facilities and may be used to identify the environmental signatures of certain processes. Other samples serve to establish current global baseline values for selected environmental signatures.



IESA database map search interface (available at: <http://iesa.eml.doe.gov>)

Nonproliferation Treaties

DTRA

As a federal laboratory, EML supports DOE's National Security mission through its detection and deterrence activities for the nonproliferation treaties. EML has been designated as the U.S. radionuclide laboratory in support of the International Monitoring System (IMS). EML has established a dedicated radionuclide laboratory, within its current facility, for the analysis of air filters by gamma-ray spectrometry in support of nuclear weapons nonproliferation. In FY 2001, a sample initially analyzed at an IMS station where it

was collected for the Comprehensive Nuclear-Test-Ban-Treaty (CTBT) was found to have activities from low anthropogenic nuclides. The sample was split and sent to two IMS radionuclide laboratories for analyses, which included EML. EML analyzed the first level five-air-filter sample and is developing procedures for the analysis, tracking, QA, and reporting of sample data to the CTBT Organization. EML also provides technical review and comments for the working group on radioanalytical issues. (Colin.Sanderson@eml.doe.gov)

Alpha-Autoramp

EM

At some DOE facilities, alpha measurements of airborne radioactive contaminants are more sensitive than gamma-ray analysis. This is especially true where the contaminants of concern are depleted uranium or plutonium since the long-lived isotopes of both these elements decay primarily with alpha emissions. In addition, in the event of an aborted nuclear detonation (fizzle), large amounts of plutonium are likely to be released into the atmosphere. Such an event cannot be detected by gamma analysis, but is detectable with alpha analysis. To address these concerns, this year EML integrated an alpha air-ionization chamber with the triaxial robotic arm of the EML AUTORAMP system. Air-ionization requires the measurement of extremely low electric currents. EML, having pioneered low current MOSFET technology, which is commercially incorporated in the world's most sensitive current measuring



AUTORAMP filter cartridge being inserted into new alpha chamber

instrument, is uniquely qualified for this development. In addition to unattended automatic operation, another salient feature is high sensitivity, which, in large measure, is due to the innovative filter/pump arrangement that is capable of sampling over 12000 m³ of air per day. (Vincent.Negro@eml.doe.gov)

Fission Finder

DTRA

A fission finder system, intended for use in on-site CTBT treaty verification, is in the early stages of investigation and development. The fission finder consists of two separate units, tentatively called the "outsider" and the "insider." These units will be built as inexpensively as possible, allowing them to be treated as disposable. Disposing or abandoning the equipment after use would assure the "Host" nation (where the measurements were made) that no information was being taken out of the country. The "outsider" would be a gamma survey/spectrometry instrument, combined with a global positioning system for coordinate location. An on-board computer would control, store and later download to a standard PC,

which when outfitted with proper software, could identify hot spot locations. The "insider" would be a far more complex unit used for determining the fission product likelihood (FPL) of various types of samples that were collected in the field. No such specialized instruments are commercially available. To date, the detector, shield and sample load arrangement of the "insider" were tested to optimize the shielding and to verify the software algorithm used for determining the FPL. In addition, several small but powerful microcomputers are being evaluated to find one suitable for this unit.

(Norman.Latner@eml.doe.gov)

Radiation Detection Panel (RDP)

NN

EML is a member of the RDP, which is a standing advisory group composed of technical experts in radiation detection from DOE laboratories. The RDP supports NN in its responsibilities for treaty monitoring, Presidential

Decision Directives, and DOE, DoD and other agencies by providing timely expert advice as requested. The RDP convened twice in FY 2001 for a technology symposium and a program review. (Paul.Goldhagen@eml.doe.gov)

Textbook On Radiochemistry

NN

EML has accepted an invitation to serve on the Editorial Advisory Board for the "Textbook on Radiochemistry." This work is being sponsored under a Nonproliferation and National Security University Research Initiative. The textbook aims to preserve and explain key findings in

the field of radiochemistry developed for the U.S. nuclear weapons programs. The textbook could be used for graduate level courses in radiochemistry, and as a reference for nuclear and cleanup workers and managers. (Isabel.Fisenne@eml.doe.gov)

Consultation and Program Management

As federal technical experts EML provides accurate, unbiased, cost effective assistance to the Department

EML staff provides support to EM and SC Headquarters in fulfilling important programmatic functions and responsibilities. As federal technical experts, the EML staff not only fulfills administrative roles, but also provides essential technical direction for several programs. EML staff are also members of several advisory committees and interagency working groups that help the Department maintain its high quality research and relevance in the areas of environmental radiation measurement and detection.

Human Subjects Research Database (HSRD)

SC

EML maintains the HSRD for the Life Sciences Division (SC-72) in SC. The database, a component of the Protecting Human Subjects Program, documents all research involving the use of human subjects that is funded by DOE, occurs at DOE facilities or is performed by DOE personnel. DOE O 443.1, "Protection of Human Subjects", requires human subjects research projects to be reported to the HSRD.

EML is responsible for creating, annually updating, maintaining and ensuring the quality

of the database. EML also provides software development and participates in the Human Subjects Working Group. The database can be accessed from EML's Web Site. EML also provides special assistance to Dr. Susan Rose, Program Manager of the Protecting Human Subjects Program. This special assistance includes assisting in field audits, conferences, publications, teleconferencing, and coordination of the Working Group activities. (Richard.Larsen@eml.doe.gov)

Long-term Stewardship

EM

EML is supporting CH in the planning of the transition to long-term stewardship at BNL. This transition is approaching rapidly, and is scheduled to occur in June 2005. Details of funding and protocols for handling over responsibility from EM to the appropriate

responsible party must be put in place before this date. EML is working closely with BNL staff and the Long-term Stewardship Office in Washington, D.C. to ensure that this will be a seamless and effortless transition. (Alfred.Cavallo@eml.doe.gov)

EM Headquarters – EML Liaison

EM

OST is the Cognizant Secretarial Office (CSO) for all EM laboratories, and has established a Laboratory Management group to supervise these organizations. In order to ensure that the EML/OST partnership is as productive as possible, an EML scientist has served on detail at EM Headquarters in

Washington, D.C. over the past two years. This has helped to provide OST with an understanding of EML's capabilities, and has enabled EML to respond rapidly and efficiently to opportunities and needs within EM. (Alfred.Cavallo@eml.doe.gov)

Memorandum of Understanding (MOU) for EM Core Labs

EM

In FY 2001, EML was involved in drafting the MOU among EM Core Laboratories. The parties involved in this MOU include the four laboratories for which EM has cognizant secretarial officer responsibility and the national laboratories that provide focus area lead laboratory support to EM. The MOU is scheduled to be signed and put into effect in FY 2002. In order to carry out this MOU, a Core Laboratories Working Group will be

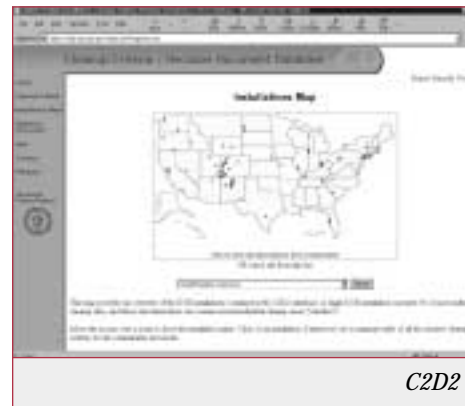
established. To ensure EM mission relevance of collaboration to its outcomes, this Working Group will include site operations representation from the four major EM sites, one closure site, and one disposal site. For any topic being considered by the EM Core Laboratories, the Working Group will identify the appropriate participants from the DOE complex, other federal agencies, universities, and industry. *(Mitchell.Erickson@eml.doe.gov)*

Cleanup Criteria/Decision Document (C2D2) Database

EM

The C2D2 database provides a central source of DOE cleanup information that can be useful to EM decision makers in the negotiation of future cleanup criteria and in assessing complex-wide status. The C2D2 database includes more than 50 data elements, such as cleanup concentration, response action, risk, and site information for 320 DOE remediation sites. Since 1999, EML has been coordinating and upgrading the C2D2 database and is working in collaboration with EM Headquarters and Argonne National Laboratory (ANL).

In FY 2001, EML developed a new user interface that will make it easier to use the C2D2 data to address EM needs. The new interface allows users to select a contaminant and medium of interest from dropdown menus and then view graphical displays. Also in FY 2001, EML presented a paper on C2D2 at the 8th International Conference on Radioactive Waste Management and Environmental Remediation (September 2001, Belgium),



and completed another paper that will be published in the International Journal of Environmental Technology and Management.

In FY 2002, EML will implement the new user interface with links through the EM web site. EML will continue to refine the interface to address EM needs, and is working on a paper to report the Web-based capabilities in a peer-review journal. *(Gladys.Klemic@eml.doe.gov)*

Advanced Survey Methods for the Clearance of Solid Materials

NRC

EML is providing assistance to the Nuclear Regulatory Commission (NRC) in several areas relating to surveys of materials, equipment, and subsurface activity. In FY 2001, EML co-authored a report with the Oak Ridge Institute for Science and Education (ORISE) on the design of surveys that could be used to determine whether materials could be released from radiological controls. This work extends the surface sampling methodology of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) to

volumetric sources. EML is working to incorporate the Bayesian geostatistical methods used in the Adaptive Sampling and Analysis Program at ANL into the Spatial Analysis and Decision Assistance (SADA) software being developed at the University of Tennessee. The aim is to incorporate prior knowledge of site contamination into a form that could be used to reduce the amount of sampling necessary to characterize, remediate, and release sites with known or suspected subsurface contamination. *(Carl.Gogolak@eml.doe.gov)*

Strategic Environmental Research and Development Program (SERDP) SC

EML continued its role as SERDP Technical Coordinator for all Departmental activities for DOE Offices (SC, EM, DP, NNSA, FE, and others) and the National Laboratories with the DoD, EPA, and other federal agencies partnering with SERDP. FY 2001 activities included developing the statements of needs related to

the DOE/DoD mission for projects to be funded by SERDP, providing guidance for the fiscal year program, reviewing and selecting proposals, and reviewing SERDP new-start and continuing research projects. In addition, EML also participates as an EM representative on the “Compliance” and “Conservation” Technical Thrust Area Working Group. (*Merrill.Heit@eml.doe.gov*)

Joint Coordinating Committee on Environmental Restoration and Waste Management (JCCEM) EM

The Russian Ministry of Atomic Energy (MINATOM) and OST have been cooperating for more than 10 years on many different aspects of mutually beneficial environmental management issues. JCCEM is the managing body of this formal Memorandum of Cooperation, operating under the umbrella of the Peaceful Uses of Atomic Energy Act. For much of this time, EML as Technical Program Manager (TPM), has led the Site Characterization and Contaminant Transport Area of Cooperation within the JCCEM,

which utilizes Russian data and expertise of groundwater contaminant transport at Russian nuclear sites. The TPM is responsible for the strategic planning and coordination of the American and Russian projects, ultimately ensuring that the technical direction of the program is beneficial to EM site cleanup activities. During FY 2001, the major activity for the TPM was the startup of a project utilizing the contaminant transport data of deep injection wells of liquid radioactive waste at the Siberian Chemical Combine, also known as the Tomsk site. (*Adam.Hutter@eml.doe.gov*)

Interagency Arctic Research Policy Committee (IARPC) EM

EML continued to provide staff representation for DOE at all IARPC meetings to ensure coordination of Arctic research activities with other federal agencies. In addition, the EML staff representative prepared all required IARPC-related reports for the Department, including the “Biennial Update

of the Arctic Research Plan,” the “Annual Overview of Agency (DOE) Arctic Research,” and responses to programmatic questions from the Arctic Research Commission (ARC). EML also serves as a member of the IARPC-related multi-agency Working Group on the “Study of Environmental Arctic Change.” (*Merrill.Heit@eml.doe.gov*)

Deactivation and Decommissioning Focus Area (DDFA) EM

In FY 2001, EML continued to serve as the Characterization, Monitoring and Sensor Technology Cross-Cutting Program’s (CMST-CP) Liaison to the DDFA. The CMST-CP provides innovative technology solutions within the OST purview of providing a full range of science and technology resources needed to support the cleanup

and long-term stewardship of EM sites. The EML Liaison to the DDFA is part of the CMST-CP Field Technical Management Team of the Nevada Operations Office. In this position, EML integrates into the Focus Area and Crosscutting Programs by participating in strategic planning, implementation, and management of OST Research and Development programs. (*Adam.Hutter@eml.doe.gov*)

Tru and Mixed Waste Focus Area (TMWFA)

EM

EM's effort in the storage of transuranic waste and spent nuclear fuel involves supporting the development of non-destructive and non-invasive characterization technologies. In FY 2001, EML provided assistance to the TMWFA on issues relevant to characterization technologies of transuranic waste and spent nuclear fuel as requested by the CMST/TMWFA liaison.

EML has also been assisting the TMWFA with the American Society of Mechanical Engineers and Spent Nuclear Fuel Review Panel reports of the Multi-Detector Assay System (MDAS). The MDAS is being developed at INEEL as a means to characterize remotely handled transuranic waste and DOE's spent nuclear fuel. *(Peter.Shebell@eml.doe.gov)*

EM-5 – Participation in IDQTF

EM

EML is a member the EM-5 Interagency Data Quality Task Force (IDQTF). The IDQTF is a federal interagency consensus workgroup comprised of voting members from EPA, DoD, EML, and the Office of Environmental Health (EH). In 2001 the IDQTF issued the Uniform Federal Policy (UFP) for Implementing Environmental Quality Systems that documents a consistent approach to the evaluation of data for hazardous waste cleanup activities. On the

recommendation of EM-5, the Assistant Secretary for EM signed the UFP document on January 19, 2001. EML continued to support EM activities on the IDQTF in 2001 by working as a voting member on the additional guidance documents to the UFP on the Quality Assurance Program Plan (QAPP) and Data Review. In concert with EM-5, EML has delivered presentations to national groups on the implementation of the UFP. *(Raymond.Bath@eml.doe.gov)*

EM-5 – QA Audits

EM

During FY 2001, EML provided technical support for the EM-5 High Level Waste (HLW) Quality Assurance Program's audits. Support was provided for annual QA audits of the HLW Programs at the Savannah River Defense Waste Processing Facility (DWPF), and the West Valley Demonstration Project (WVDP). Audits are conducted to assess the adequacy and effectiveness of the Quality Assurance Program implementation as applied to waste acceptance activities associated with the HLW vitrification process. These audits are conducted to meet the provisions of the Office of Civilian

Radioactive Waste Management QA Requirements and Description (*QARD, DOE/RW-0333P*).

EML provided technical personnel to the audit teams for the purpose of assessing the facility's QA associated with sampling, analytical data, analytical and radioanalytical procedures, instrument calibration, traceability, and laboratory personnel training protocols. The results of these assessments were detailed in the Quality Assurance Program Audit Reports issued for each facility.

(Raymond.Lagomarsino@eml.doe.gov)

Los Alamos Pueblo Project

EM

The Los Alamos Pueblo Project (LAPP), jointly sponsored by the National Nuclear Security Administration, Office of Defense Programs and EM, funds environmental programs and provides assistance to the four Accord Pueblos. The Pueblo are implementing, as part of their environmental programs, an independent assessment of the impact of Los Alamos National Laboratory (LANL) operations and activities on their resources. During FY 2001, EML continued its participation as a member of the Technical Advisory Review Team. The Team provides ongoing technical guidance on the design

and management of environmental monitoring programs, sampling and analysis protocols, and data quality evaluation procedures, and an annual assessment of the progress of each of the Pueblos. In FY 2001, EML also provided training for the use of a directed planning process for environmental data collection.

In FY 2002, "A Guide to Beginning an Environmental Program," developed by the Technical Advisory Team will be published by the National Nuclear Security Administration (NNSA).

(Catherine.Klusek@eml.doe.gov)

Agency for Toxic Substances and Disease Registry (ATSDR)

EM

EML provided technical assistance to the ATSDR located in Atlanta, GA. Elevated concentrations of uranium had been found in a South Carolina community served by well water. Sample collection, preservation, detection techniques, QA, and quality

control regimes were discussed with the ATSDR. The value of the EML's Web Site for tracking performance of laboratories (by matrix and radionuclide) through EML's QAP link was highlighted.

(Isabel.Fisenne@eml.doe.gov)

Multi-Agency Radiological Laboratory Analytical Protocols(MARLAP)

EM

Of critical importance to informed decision-making is data of known quality appropriate for its intended use. The MARLAP manual addresses the need for a nationally consistent approach to producing radioanalytical data that meets a project or program's data requirements. The MARLAP manual was prepared by a multi-agency technical workgroup composed of representatives from the DoD, DOE, EPA, NRC, NIST, U.S. Geological Survey (USGS) and the Food and Drug Administration (FDA). State participation in the development of the manual involved contributions from representatives from the Commonwealth of Kentucky and the State of California. The basic goal of the manual is to provide guidance and a framework for project planners,

management and laboratory personnel. In FY 2001, EML continued to provide a lead technical role in the development of several chapters of the manual and participated in the development of modifications to the Manual based on comments received from the review by the participating agencies. EML assisted the MARLAP Working Group by developing and hosting the site for the public comment period (August through December 2001). EML will participate in a special session at the 47th Annual Radiochemical Measurements Conference in Honolulu, Hawaii in November 2001 to present highlights of the manual to the radio-analytical professional community.

(Catherine.Klusek@eml.doe.gov)

Interstate Technology and Regulatory Cooperation (ITRC) COALITION

EM

In FY 2001, regulators from the New Jersey's DEP invited EML to contribute to the ITRC by being a member of the Sampling, Characterization, and Monitoring Team. The ITRC is a state-led national coalition whose mission is to create tools and strategies to reduce interstate barriers to the deployment of innovative environmental technologies. ITRC

receives over 60% of its funds from DOE. As part of the Sampling, Characterization, and Monitoring Team, EML will summarize the efforts of the Real-Time Measurement Group at FEMP. This effort will help inform and educate state regulators on innovative characterization techniques for soils developed by FEMP. (*Peter.Shebell@eml.doe.gov*)

U.S. Transuranium and Uranium Registries (USTUR) Advisory Committee

EM

The USTUR were established to perform measurements on former actinide workers to verify the mathematical models used to estimate radiation doses from inhalation, ingestion, and wound exposures. The information gathered by the USTUR has been folded into the radiation dose estimates of the National Council on Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP). The Advisory Committee to the USTUR provides an independent review of the work in progress and envisioned.

The Committee consists of seven members: one from Washington State University, the location of the USTUR; one from the general public; one from organized labor; and the remaining members are selected from the scientific community with expertise in health physics, radiochemistry, radiobiology, and bioethics. EML has participated for four years on the Committee in the dual role of radiochemistry expert and DOE representative to the Committee, and has an additional two-year appointment. (*Isabel.Fisenne@eml.doe.gov*)

IAEA Fellowship Cooperative Research

EM

EML, in cooperation with the National Research Council, provides training for recipients of fellowships sponsored by the IAEA. A fellow from the Research Institute of Radiology (RIR) in Gomel, Belarus spent three months at EML in training for the evaluation of environmental levels of selected alpha and beta emitting radionuclides. In FY 2001, two sample sets from different regions within

the area contaminated by the Chernobyl accident were analyzed for ^{238}Pu , $^{239/240}\text{Pu}$, ^{241}Am , and ^{90}Sr . The results of the analyses provided the RIR scientists estimates of current actinide levels in the regions affected by the Chernobyl fallout. The data will be used to re-evaluate the sampling protocol of Belarus soils, and the existing methodology for ^{90}Sr measurements. (*Anna.Berne@eml.doe.gov*)

Awards and Recognition

EML Scientist Receives Japanese Research Award

Dr. Hsi-Na (Sam) Lee of EML was sponsored by the Science and Technology Agency in Japan, under the research award, "Foreign specialists in the comprehensive, basic study field of atomic energy," to visit research institutes in Japan from March 5 - 24, 2001. As part of the research award for visiting scholars, Dr. Lee worked with scientists at the Meteorological Research Institute (MRI) to improve their model calculations on the fate and transport of atmospheric radionuclides and Asian dust. Improved modeling with a resuspension component will be important to sites in the DOE complex, particularly those in the dryer regions such as Rocky Flats and the Nevada Test Site. Collaborations between EML and MRI will continue in FY 2002.



Visit to the National Institute of Radiological Sciences (left to right: Dr. Yuji Yamada, Section Head, Dr. Lee, Dr. Shinji Tokonami, and Dr. Yasuhito Igarashi)

EML Scientist Named Chairman of Radiation Effects Research Foundation (RERF)

Dr. Burton Bennett was elected Chairman of RERF at the annual Board of Governor's Meeting held in Hiroshima, Japan, May 26-27, 2001. RERF is the joint United States-Japanese study of the health effects of radiation in those exposed to the atomic bombings. Dr. Bennett is the 5th Chairman and the first American to hold the position since the Foundation was formed in 1975 as the successor organization to the Atomic Bomb Casualty commission. DOE (EH-6)

manages the United States funding for the project through its contractor, the National Academy of Sciences. Dr. Bennett has over 20 years international experience with the United Nations, including 12 years as Director of the Secretariat of the United Nations Scientific Committee on the Effects of Radiation, prior to rejoining EML last August. Dr. Bennett left government service to take up the position at RERF in Hiroshima, Japan, on July 1, 2001.

EML Chemist Elected as President of Chinese American Society of Mass Spectrometry (CASMS)

Ms. Ada Kong was elected President of CASMS at the May 2001 meeting attended by 180 members. This meeting was held in

conjunction with the 49th American Society of Mass Spectrometry Conference in Chicago, Illinois. Ms. Kong will serve a two-year term.

EML Scientist Elected a Fellow of the Health Physics Society

Dr. Carl V. Gogolak was elected a Fellow of the Health Physics Society. This award is given to senior members of the Health Physics Society in recognition of significant administrative, educational, and/or scientific

contributions to the profession of health physics. The Award Certificate was presented at the Awards Luncheon at the Health Physics Society Annual Meeting in Cleveland, Ohio, on June 12, 2001.

The theme of the 2001 meeting of the National Council of Radiation Protection and Measurement (NCRP) was “Fallout From Atmospheric Nuclear Tests: Impact on Science and Society.” This meeting marked 50 years since the beginning of global fallout monitoring. EML made significant contributions to the meeting and both current and former staff participation attested to the prominent role that the Laboratory has played in fallout studies over the past half century. EML staff authored or co-authored three separate invited papers for the meeting. Dr. Burton Bennett of EML served as a member of the Program Committee and was a Session Chairman.

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